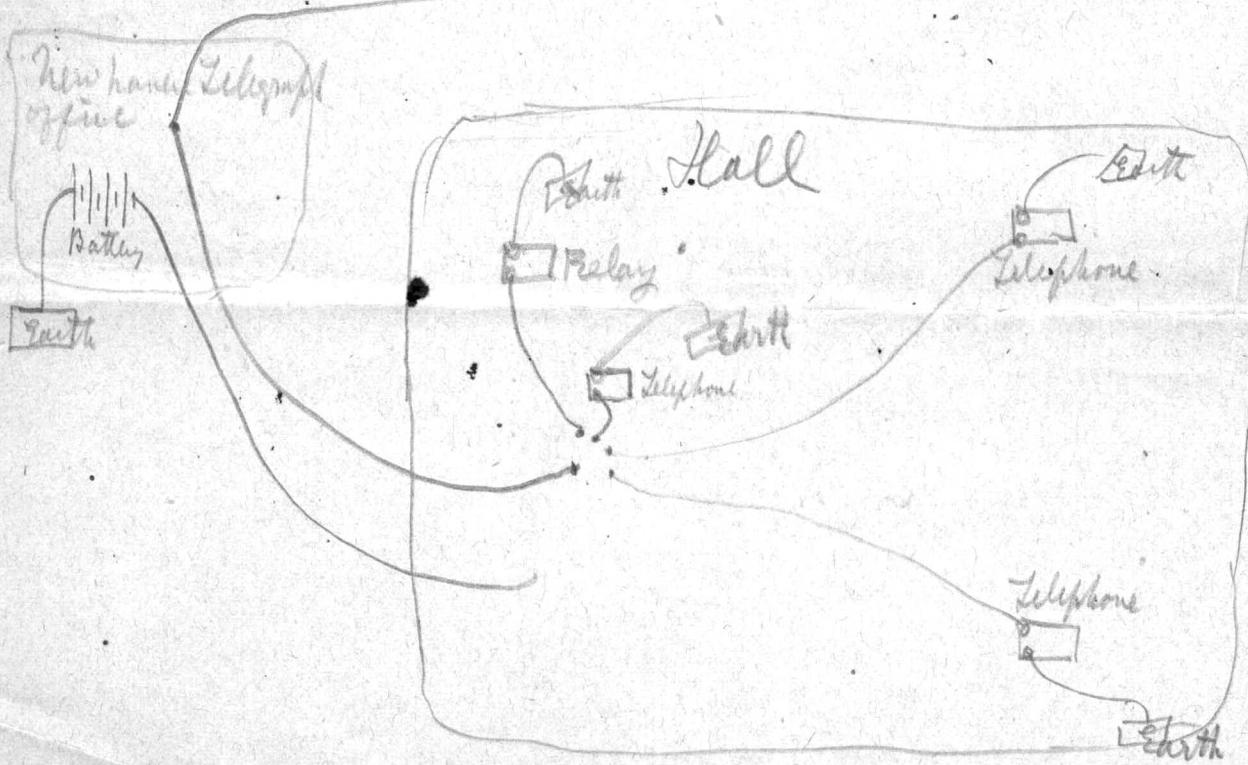
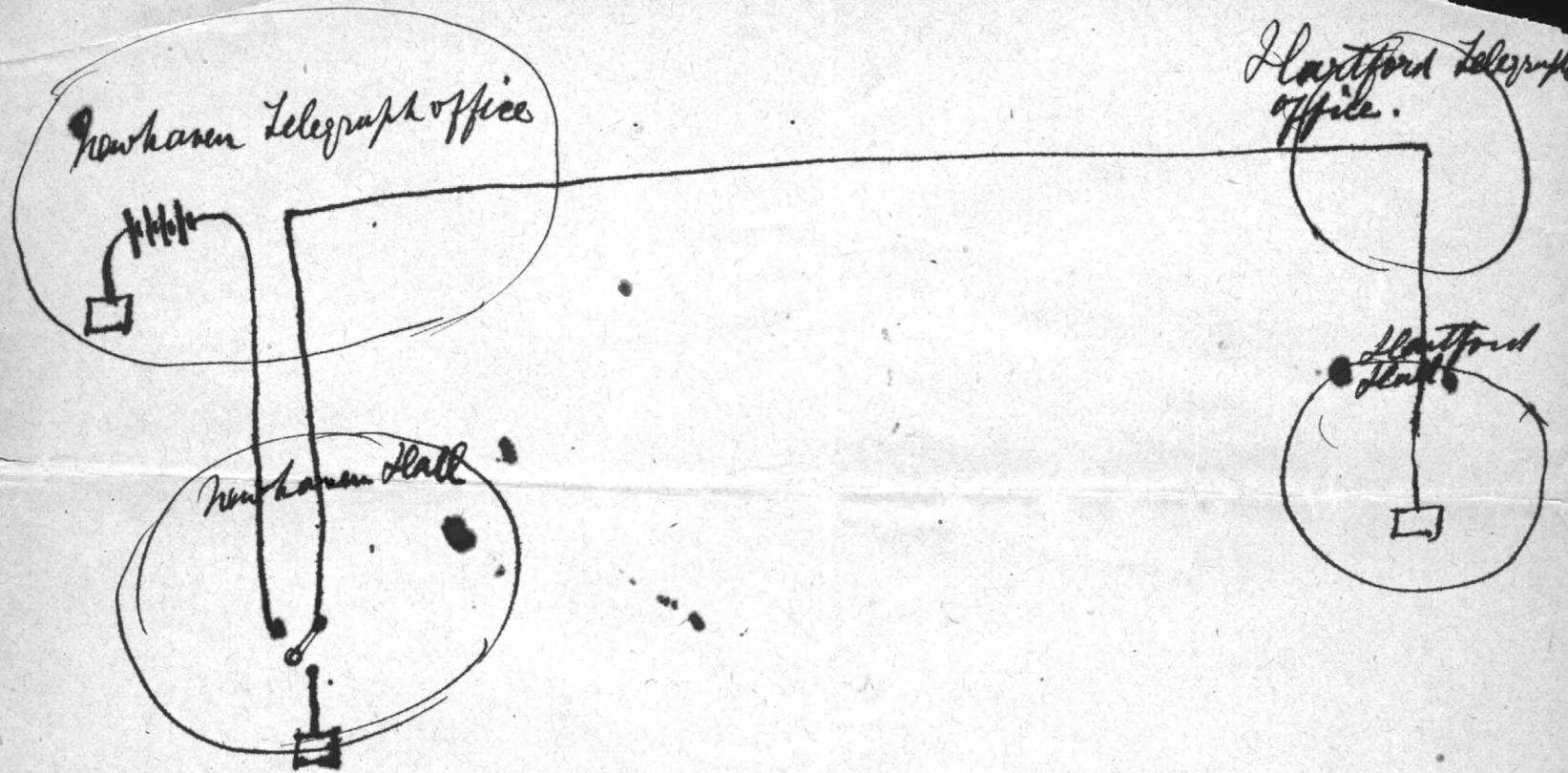
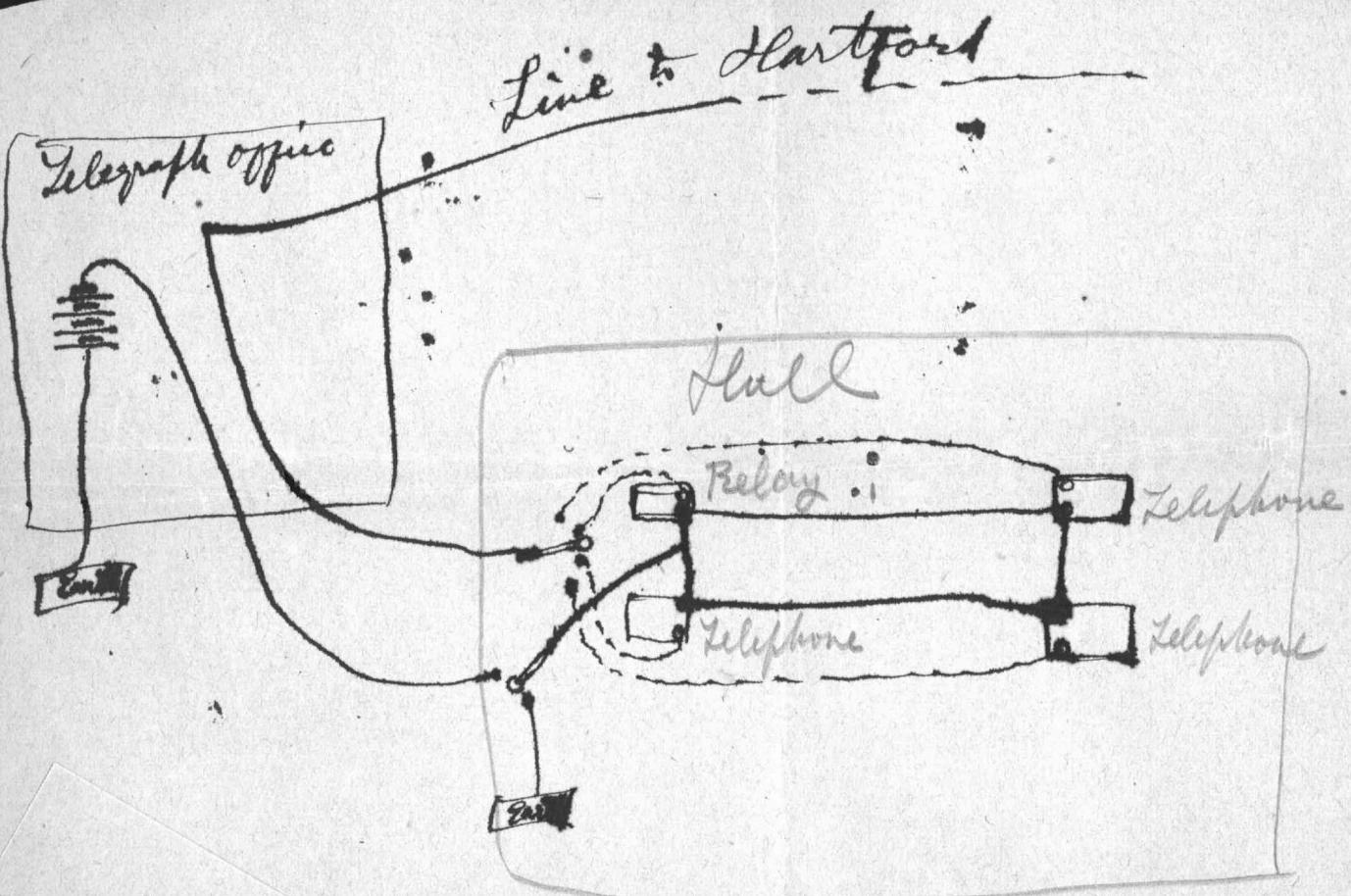
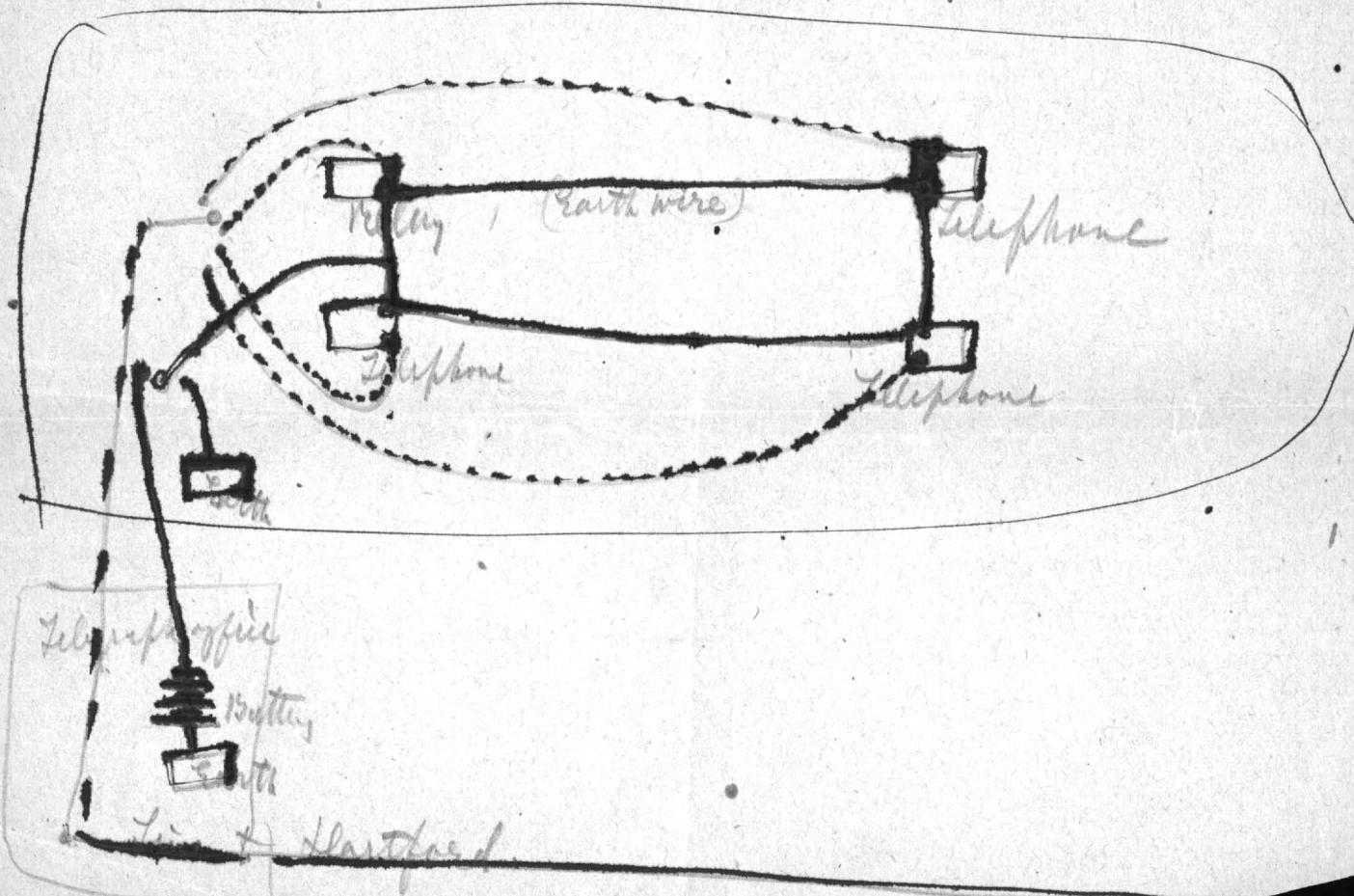


New Haven Connections
Line to Hartford

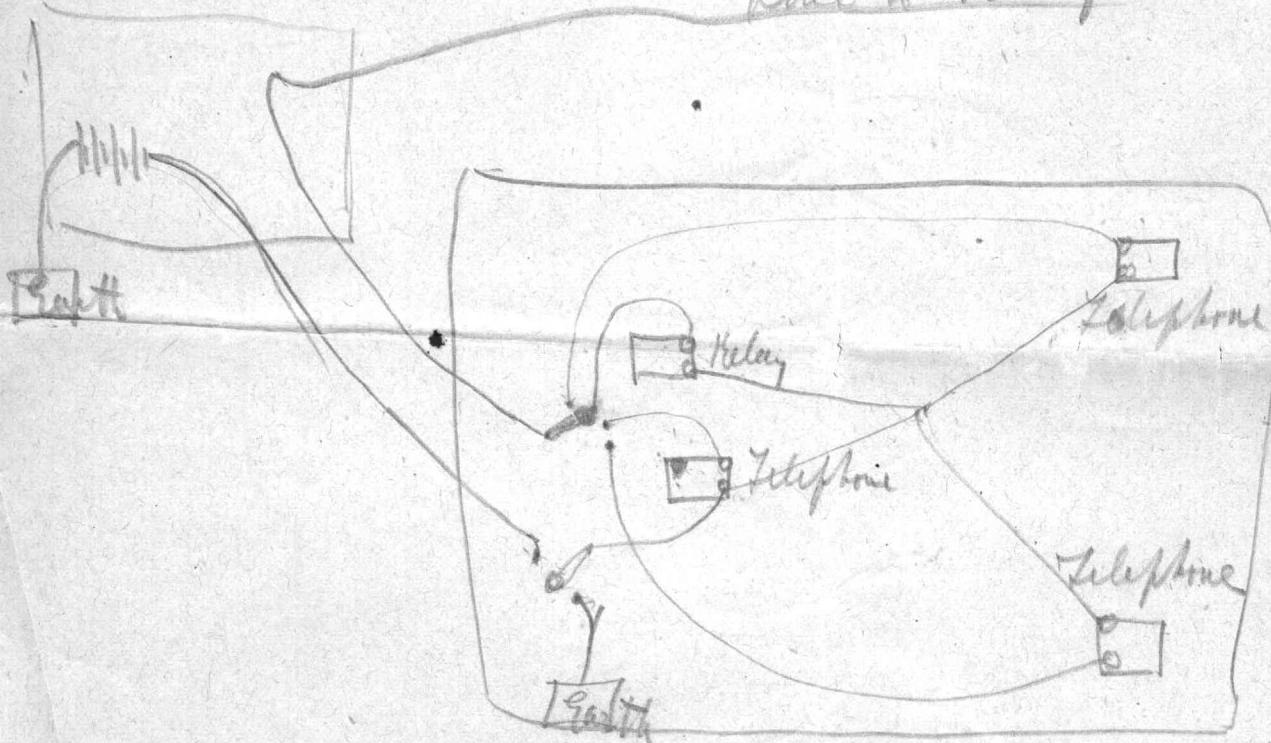


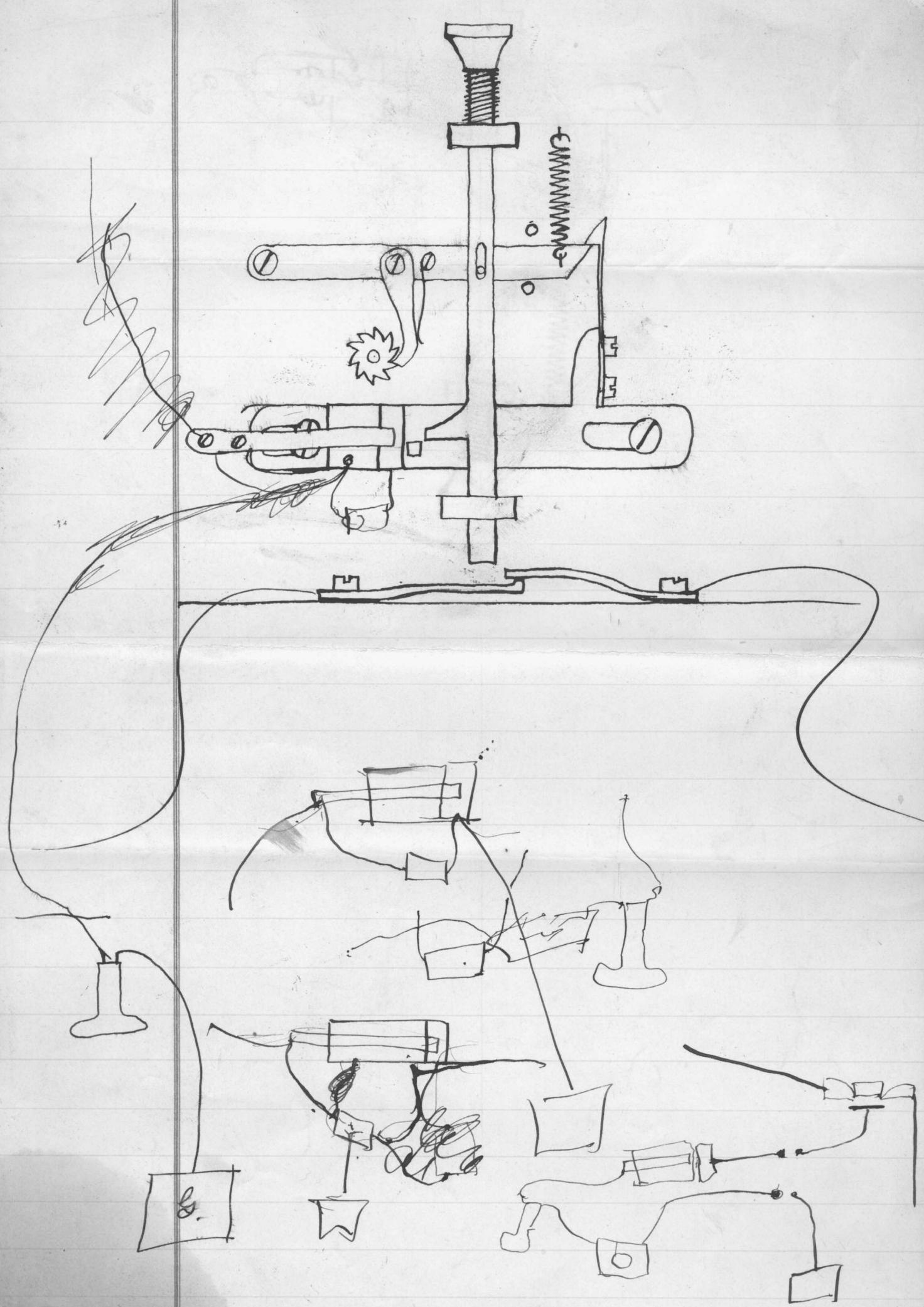


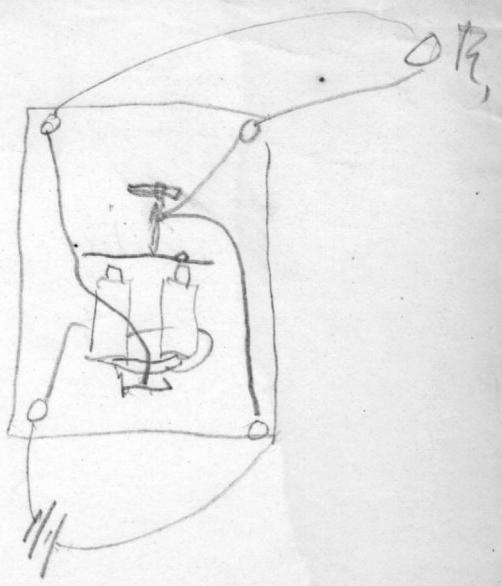




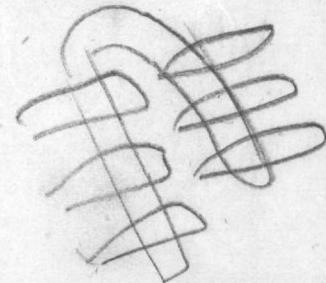
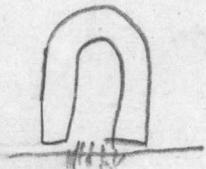
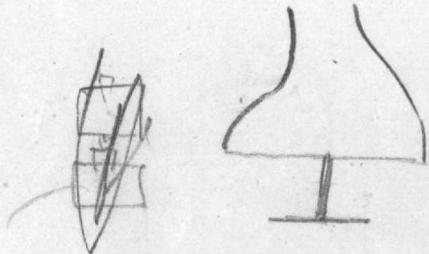
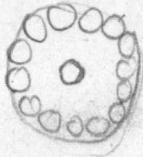
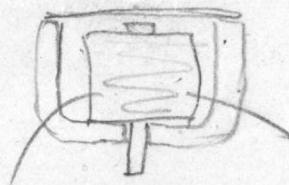
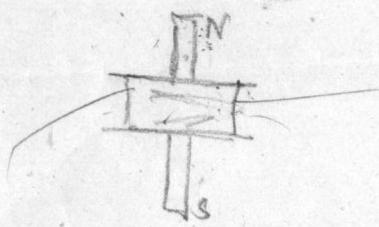
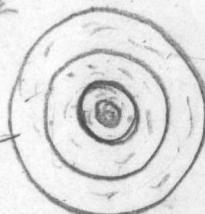
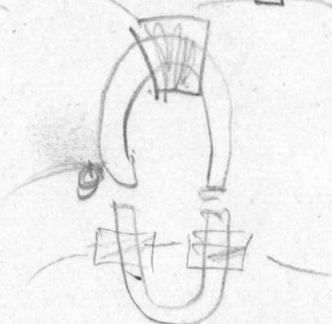
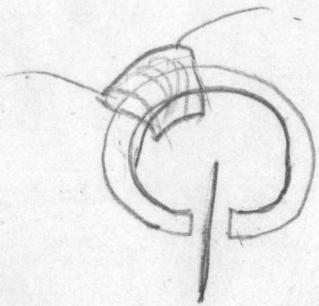
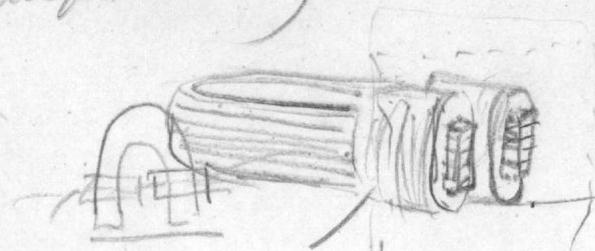
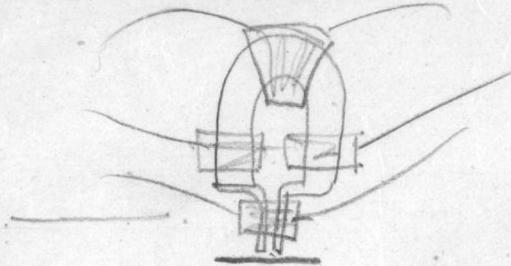
Line to Hartford





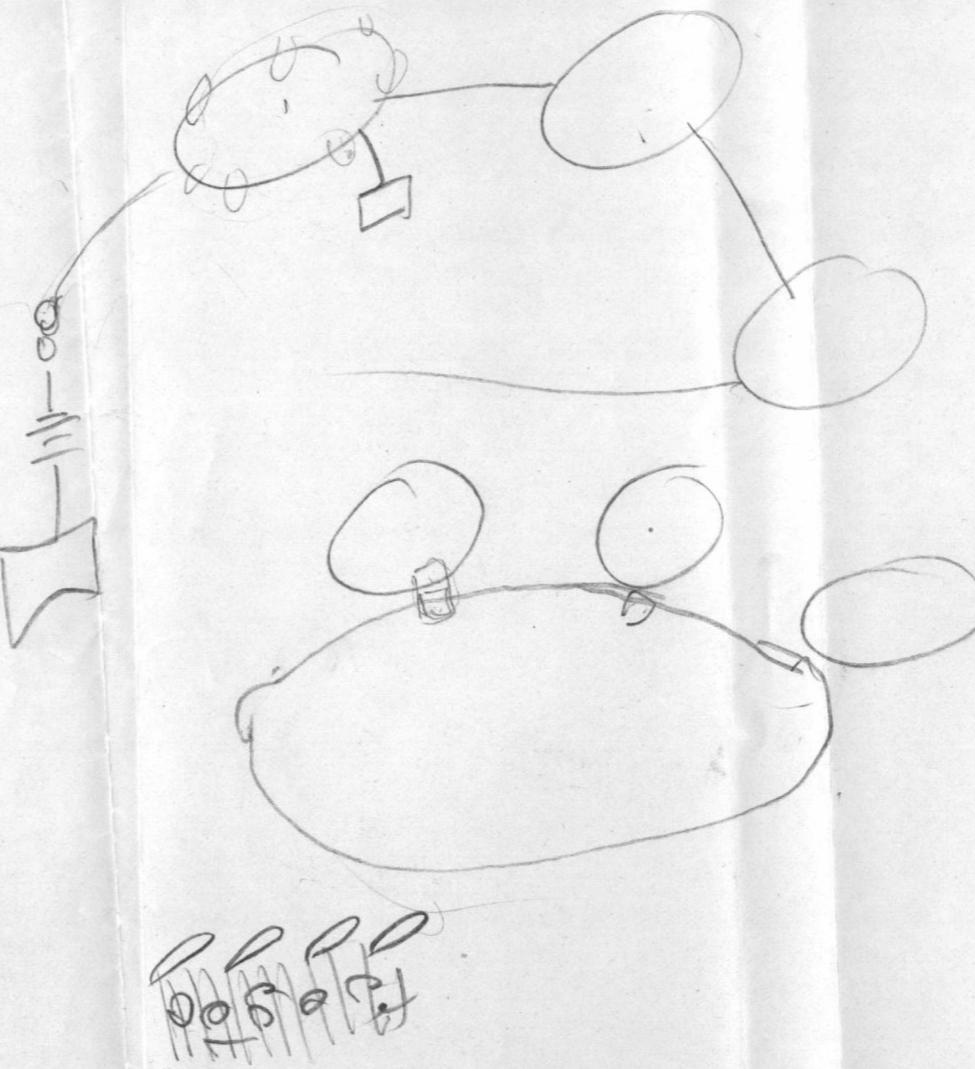
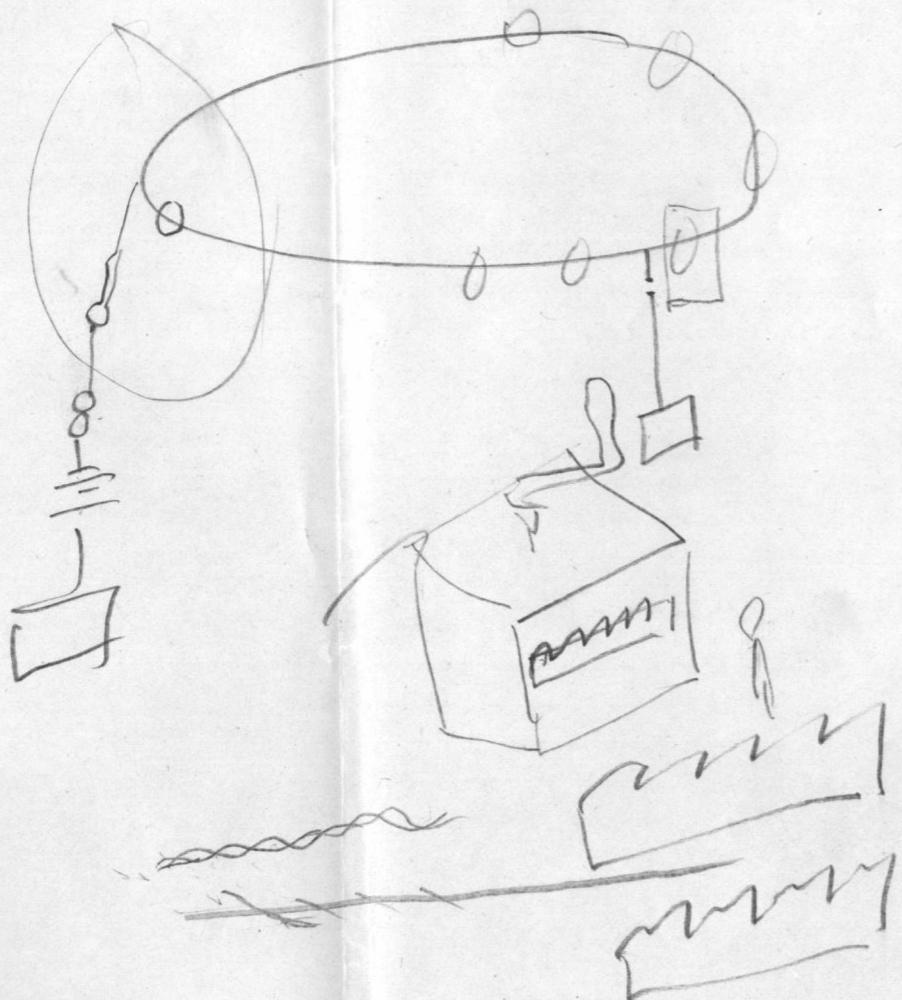


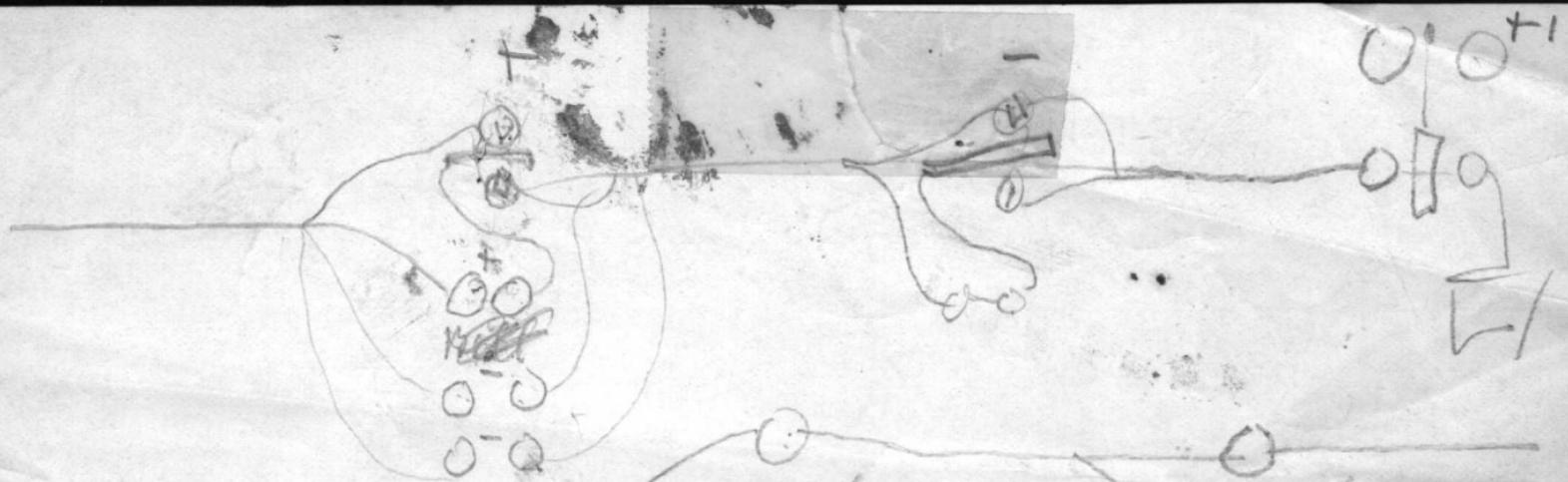
(Relaxing arm.)



Silene Armeria vibraria L. var. f. Rauli.

Gramine " " " "

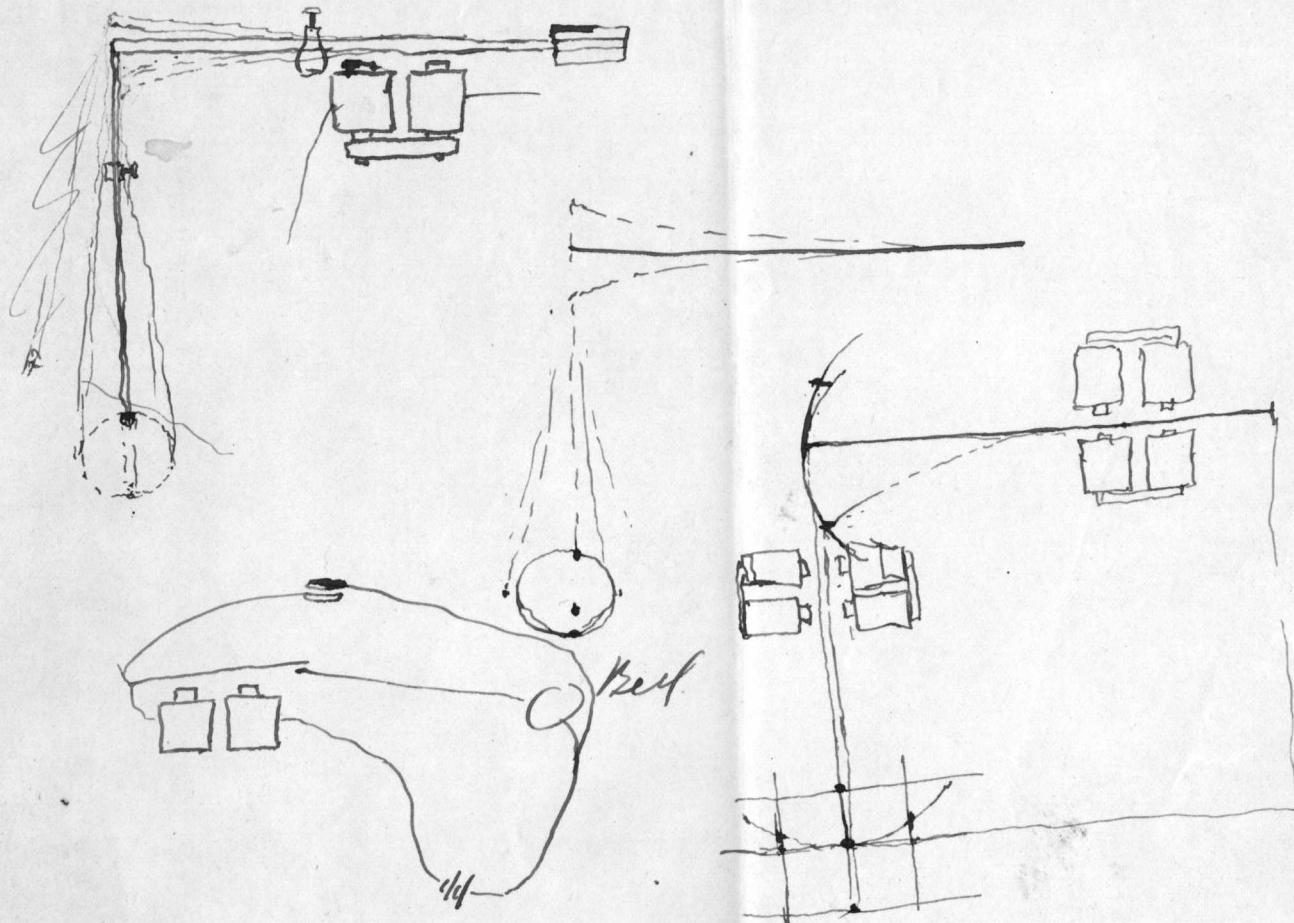


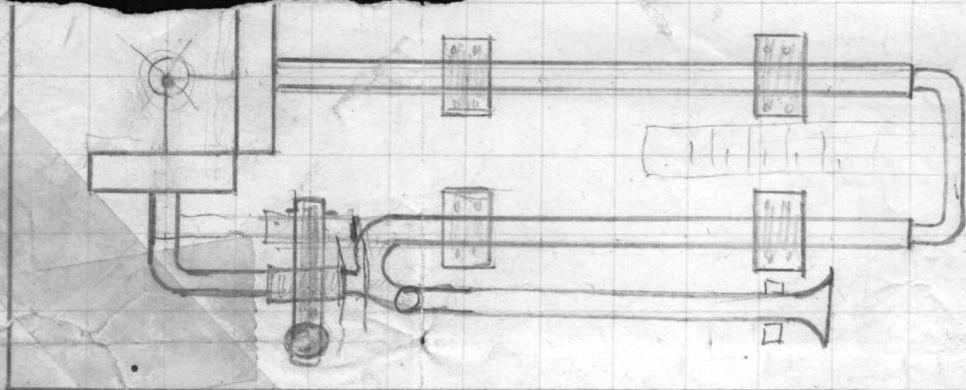


0 0 +1

0 0

1 1



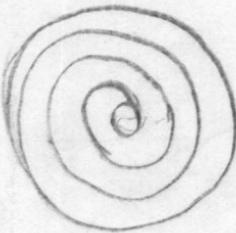


5.2

Base board 3ft long by 1 ft wide

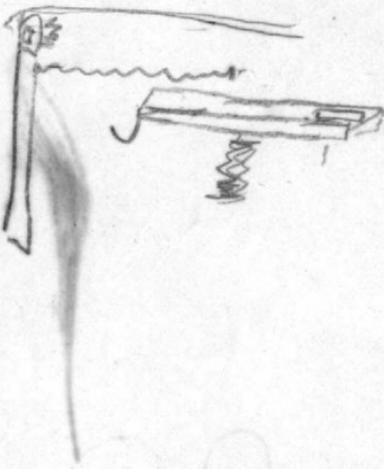
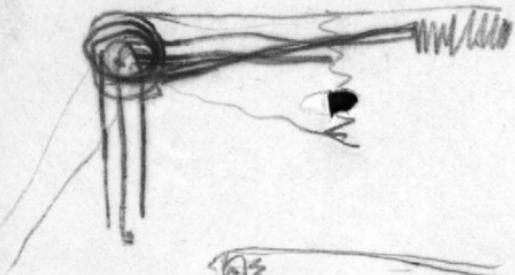
Brattle st corner of spark st - 2 ~~2~~

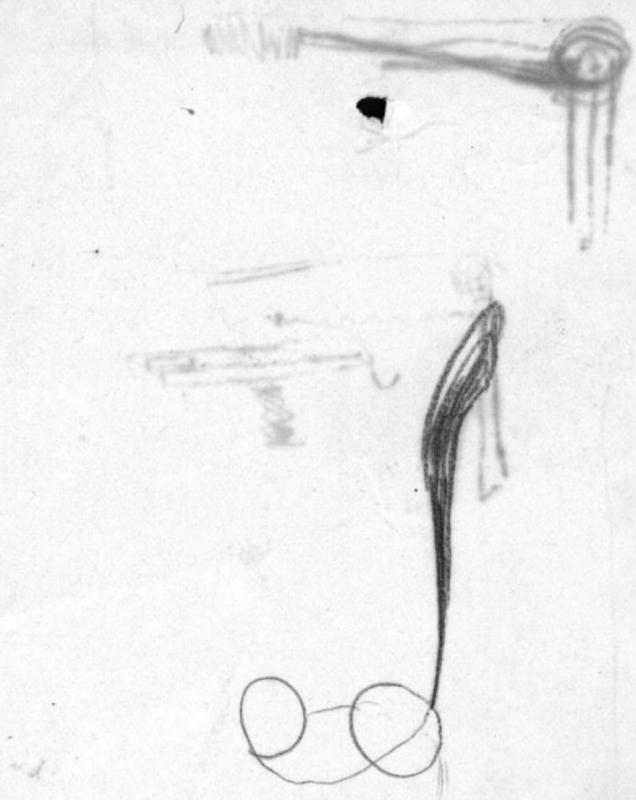
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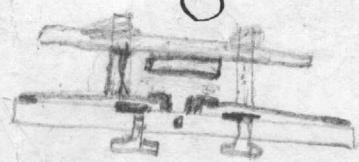
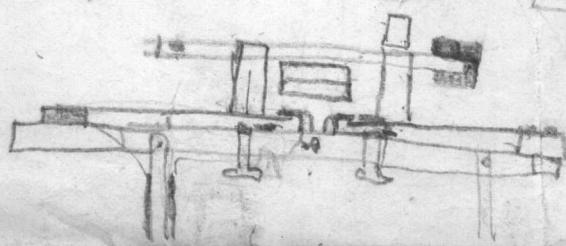
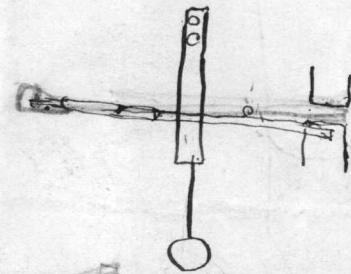
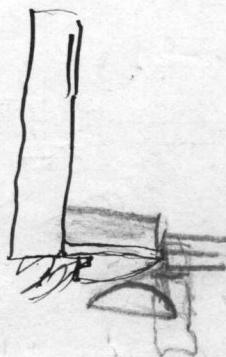
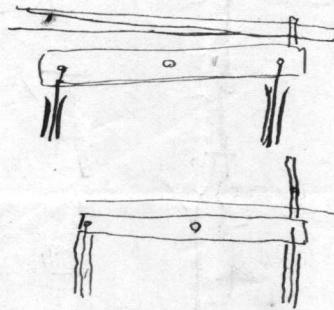
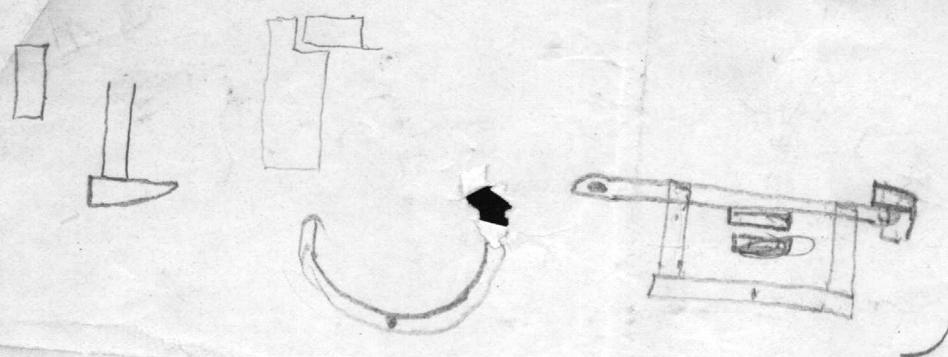


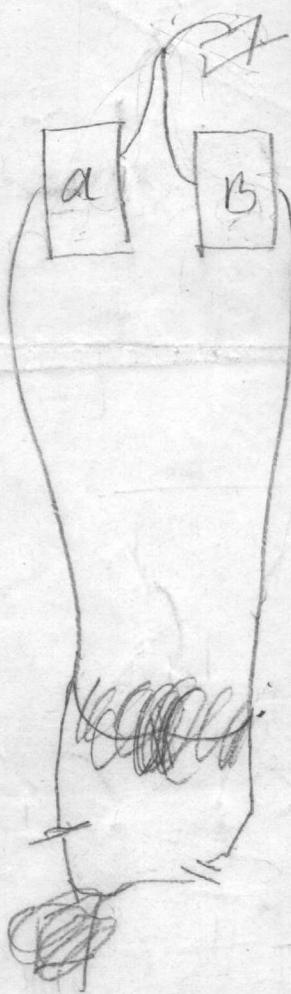
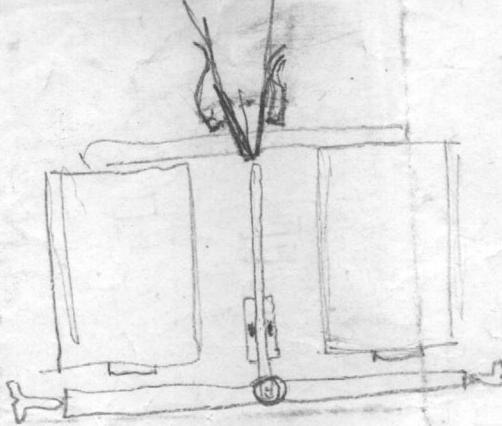
~~\$~~ 2000

© Tim Tiel

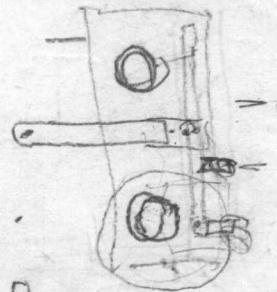
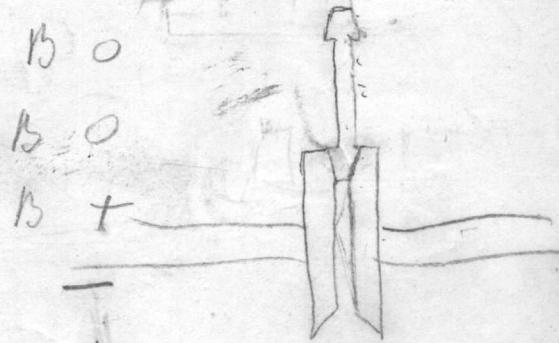






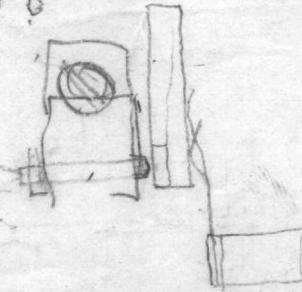


1 A + B 0
2 A - B 0
3 A 0 B +
4 A 0 -
5 - +
6 + -
7 + -
8 -

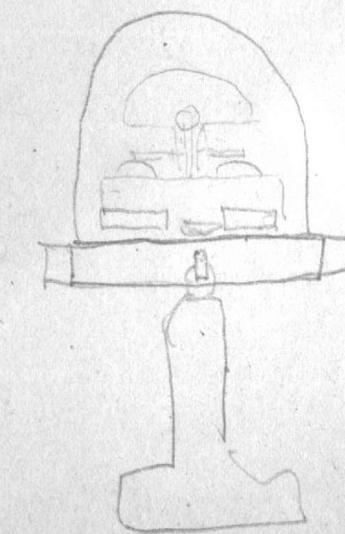
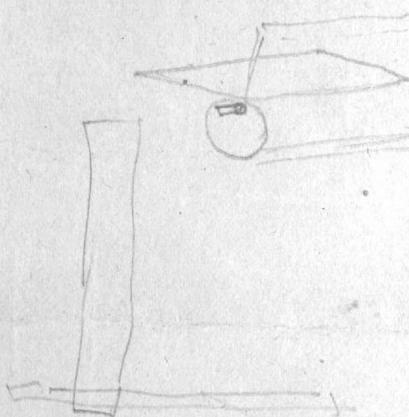
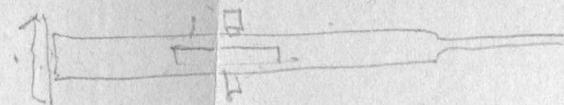
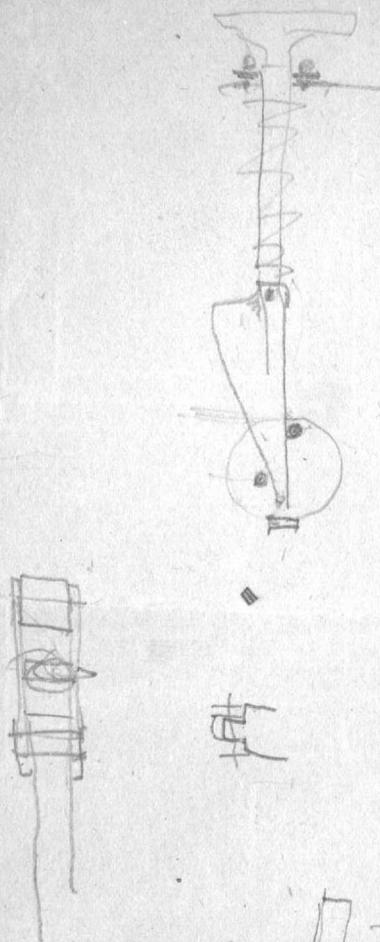


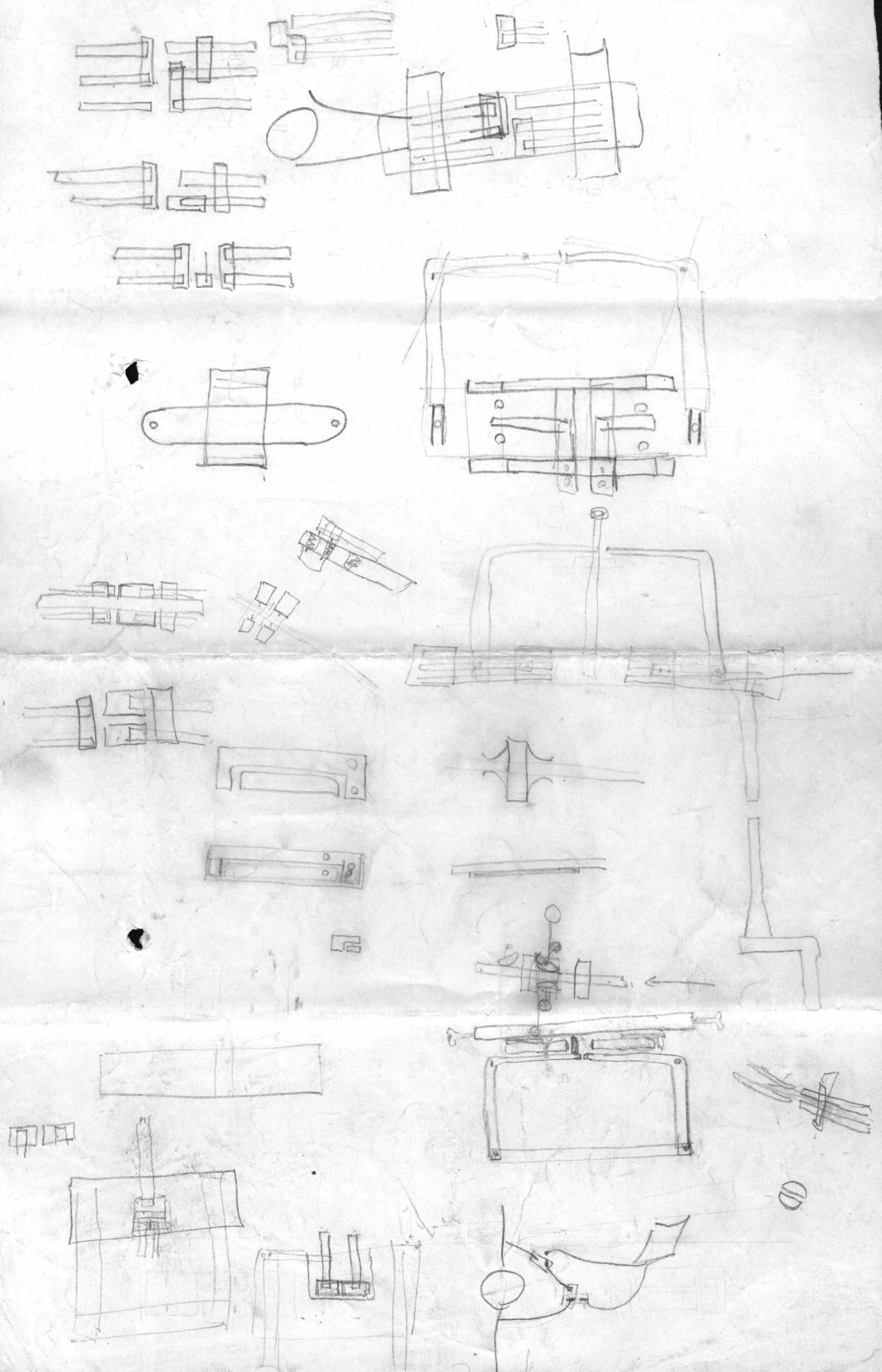
0 0

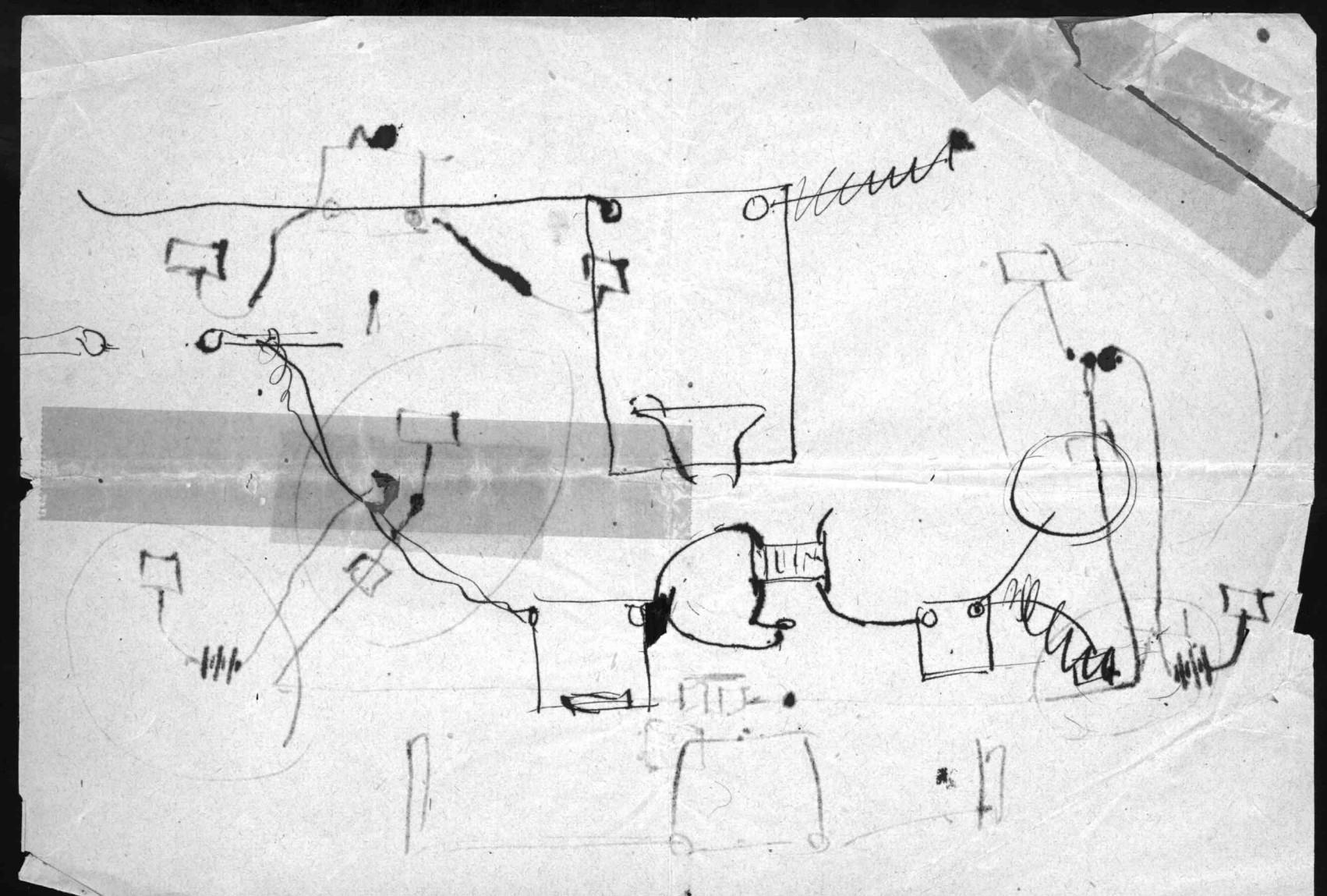
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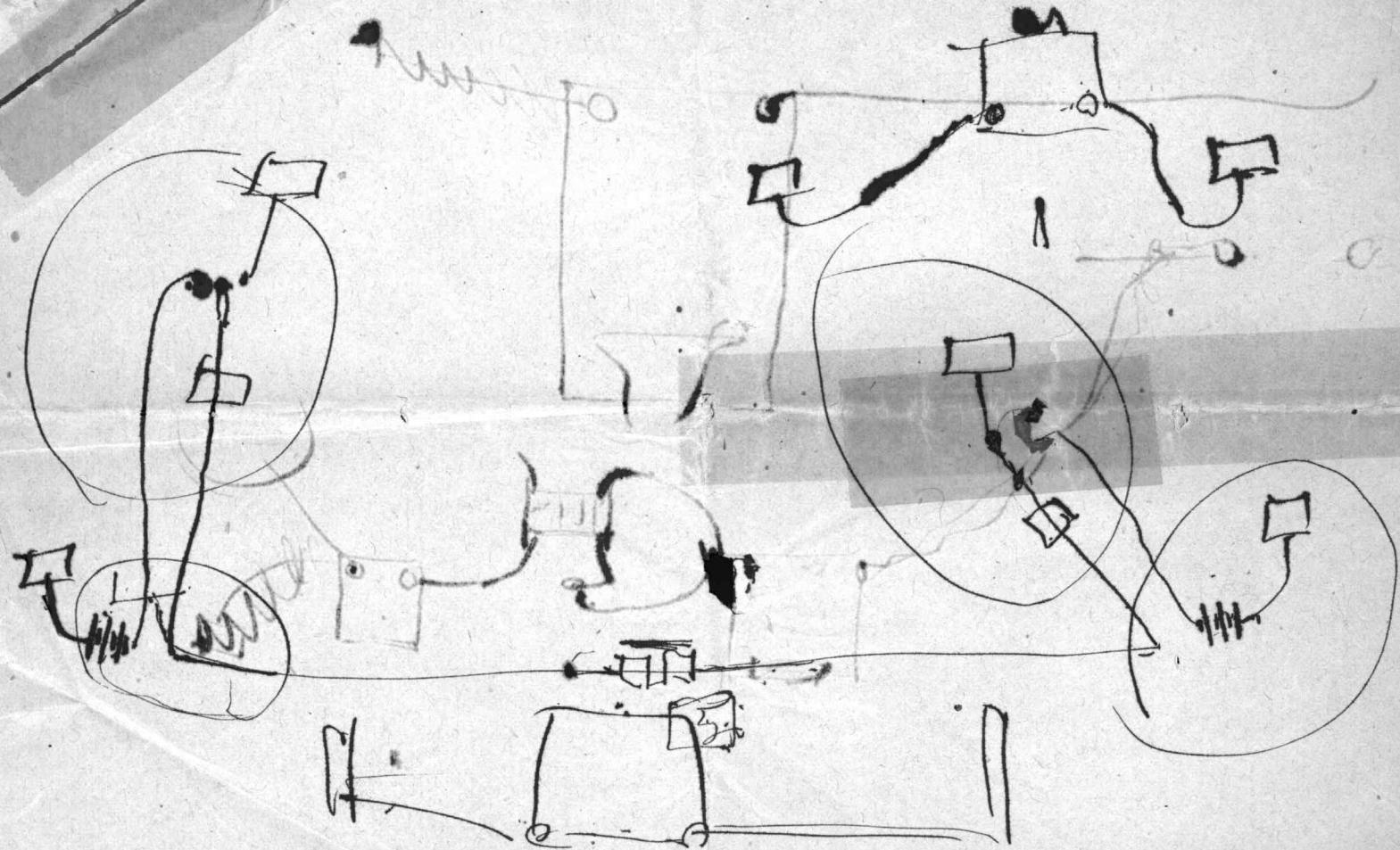


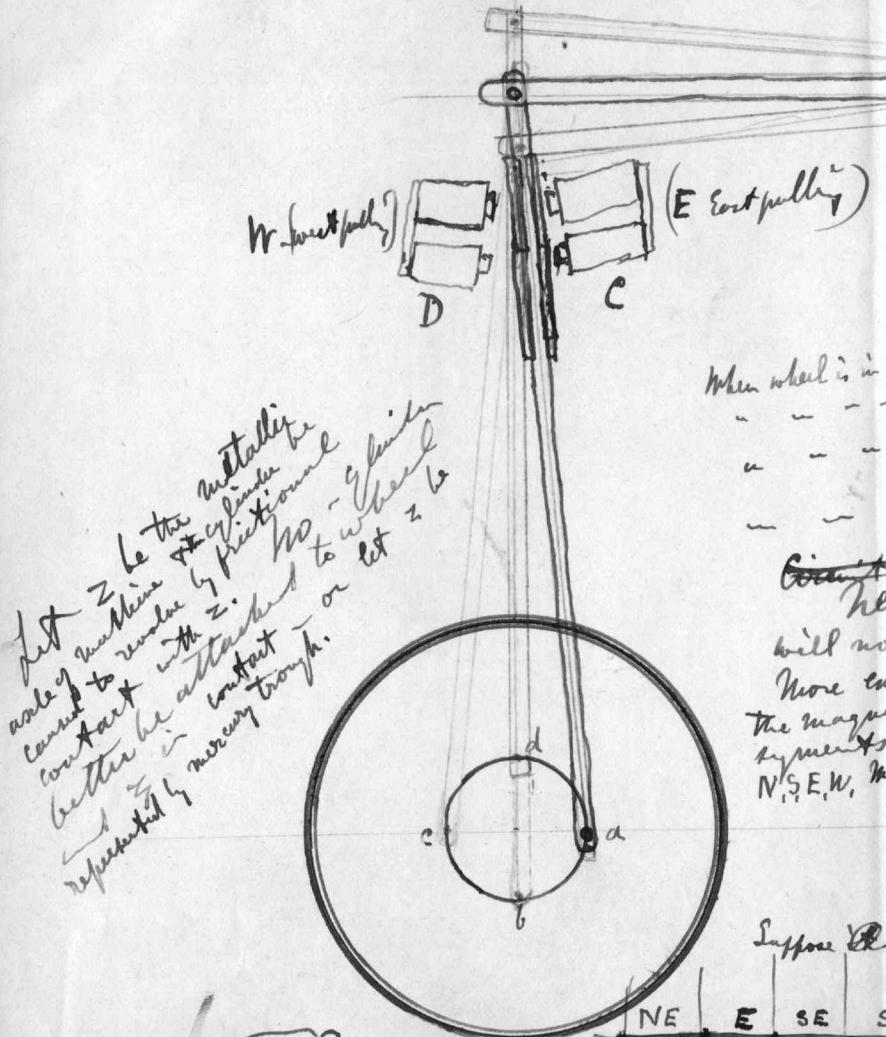
35°
300
105,000











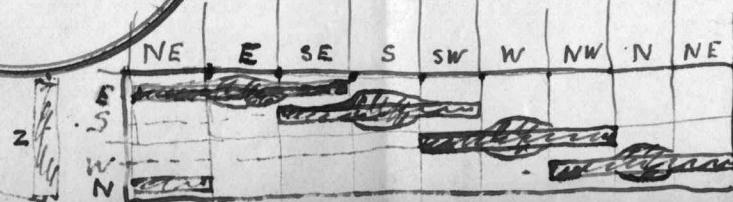
When wheel is in position
 a a alternate magnets
 b " " "
 c " " "
 d " " "

A	and	D
B	-	D
B	"	C
A	-	C

~~Circuit open~~
 Will not trouble as
 More exact arrangement & would fit as below
 the magnets to be spaced less & placed in the proper
 segments & marked as S, N, E, W.
 N, S, E, W, magnets.



Suppose the cylinder unrolled



Non-metallic cylinder with
 conducting strips ESWN
 connected with corresponding
 magnets. Let strips be
 carbon or other insulating
 material & let them be broad at the
 center where the connecting wire
 is attached and taper to a point
 at either side. Let metallic roller
 connected with battery be passed over cylinder

Maynard's house Nat. curr. 4° deflec. Copper current -

Central office

170

zinc

250

copper

" "

430

zinc

" "

360

Copper

Natural current = 17 degrees to left -

Government Print'g office 500 zinc

" "

600

copper

Natural current = 19° to right

Copper to ground same deflect. to right.

Resultant Resistances

Central office - 210 → copper current equal to 60 ohms resist

Capitol — 395 — zinc current equal to 35 ohms resist

Govt Print. off. 550 — copper current equal to 50 ohms resist

~~8~~ ~~88~~

$$\begin{array}{r}
 424) 15 = 75 \\
 \underline{-} \quad \underline{\cancel{1}} \quad \underline{\cancel{2}} \\
 1 \quad 2 \quad 7 \quad 2 \\
 \underline{-} \quad \underline{3} \quad 0 \quad 3 \quad 0 \\
 \quad \quad 2 \quad 9 \quad 6 \quad 8 \\
 \quad \quad \quad \underline{-} \quad \underline{6} \quad 2 \quad 0 \\
 \quad \quad \quad \quad \underline{4} \quad 2 \quad 9 \\
 \quad \quad \quad \quad \underline{-} \quad \underline{1} \quad 9 \quad 6 \quad 0
 \end{array}$$

$$5250 \overline{)20352} \quad 3.87$$

15750
46020
42000
40200

$$\begin{array}{r} 4 \cdot 24 \\ \times 4 \cdot 6 \\ \hline 4 \end{array}$$

388 424 468
19 23 23

$$\begin{array}{r}
 4.6 \\
 \times 5.8 \\
 \hline
 368 \\
 230 \\
 \hline
 26.68
 \end{array}
 \quad
 \begin{array}{r}
 19 \\
 \times 1272 \\
 \hline
 848 \\
 127 \\
 \hline
 352
 \end{array}
 \quad
 \begin{array}{r}
 23 \\
 \times 5.123 \\
 \hline
 19 \\
 25 \\
 \hline
 62
 \end{array}$$

Our improvements will be understood by reference to the accompanying drawing
which ~~describes~~ ~~a number of~~ ~~their telephones~~ ~~are~~ ~~to be~~ ~~used~~
~~upon a telephone circuit~~ ~~of~~ ~~Magneto-electric Telephones upon~~
~~an arrangement upon circuit of a number of~~
~~other~~ ~~Fig I~~ ~~a telegraphic circuit~~ some of which are ~~shown~~
as operating other telephones upon secondary circuits.

Fig I shows a Telephone similar to that described in Letters
Patent No. — — — — — dated Jan. — 1877 — excepting that
a single coil ~~a~~ surrounds both poles of the permanent
magnet b — ~~the said poles being~~ ~~near together so as to~~
render the magnetic field very small & intense.

The vibratory current employed for the purposes
of multiple telegraphy may appear in the
form of

Induced current:
caused by

Voltaic current

Action of
Voltaic current

Intermittent current

{ produced by making & breaking the circuit.
produced by alternate positive & negative
impulses.

Continuous current

{ having a periodical change of intensity.
composed of alternate positive & negative
impulses.

Intermittent current

{ produced by making and breaking the circuit.
produced by alternate positive & negative
impulses.

Continuous current

{ having a periodical change of intensity.
composed of alternate positive & negative
impulses.

intermittent
current

{ impulses all having the same polarity.
alternate positive & negative impulses.

intermittent
continuous
current

{ impulses all having the same polarity.
alternate positive & negative impulses.

intermittent
current

{ impulses all having the same polarity.
alternate positive & negative impulses.

continuous
current

{ impulses all having the same polarity.
alternate positive & negative impulses.

intermittent
current

{ impulses all having the same polarity.
alternate positive & negative impulses.

continuous
current

{ impulses all having the same polarity.
alternate positive & negative impulses.

The new invention which I am desirous

I have anxious to be out and latest invented
are so much in advance of the existing that it is difficult to compete
simultaneously in America & England - and
I am only desirous of applications here until I have com-
first parties to assist me about
take up the matter abroad

It frequently happens that when ~~an~~ inventor by dint
of hard work and laborious research - brings
to perfection some startling discovery and proves
its reality in the face of an incredulous world
- others will afterwards appear to rob
~~him~~ ^{him} of the credit of his discoveries and to
appropriate the fruits of his labours.

When in 1876 Sir William Thomson first
directed ^{public} attention to the results I had obtained
in the production of articulate sounds by
electrical means - it was only the
few who had reliance

I have been somewhat amused at the articles that have appeared ~~in the papers~~ from time to time in the public press concerning the original inventor of the Speaking Telephone

~~art~~

Interference A is declared upon the ~~method~~ of transmitting articulate speech by the production of ~~modulatory currents~~ of electricity

A - Interference A is declared upon the art of transmitting or reproducing at a distance the sounds of articulate speech by means of ~~modulatory currents~~ of electricity.

B - Interference B is declared upon ~~one of the methods~~ ^{a particular one} of producing ~~modulatory~~ currents of electricity — ~~by the production~~ ^{of} varying the resistance of the circuit.

C. Interference C. is declared upon one of the ways in which the resistance of the circuit may be varied so as to produce modulatory currents of electricity viz — by introducing into the circuit a liquid or equivalent substance of high resistance.

D. Interference D is declared upon the mechanical details of an apparatus for varying the resistance of a circuit through the medium of a liquid so as to produce modulatory currents of electricity.

In J. the ~~apparatus itself~~ combination constituting the apparatus itself is claimed; ~~irrespective of its use~~

In F and I the claim is to the use of the apparatus as a transmitter;

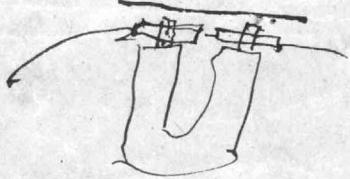
In E and G - to its use as a receiver; and in H^K to its use either as a transmitter or receiver.

~~at~~
~~& & patent F & I~~

The distinction between E & G is simply that the ~~word "plate"~~ is ~~not~~ term "elastic inductive plate or armature" is used in E^K where "diaphragm" is mentioned in G^K. ~~that between F & I is substantially the same distinction~~ The difference between H and K also is simply that in K the magnet employed is of the horse-shoe form while in H

The distinction between ~~E & G~~ E & G is simply that the term "elastic inductive plate or armature" is used in E where "diaphragm" is mentioned in G.

~~The difference between F & G - is that the term ~~itself~~, F & G are also distinguished by specifying "plate" iron or steel diaphragm" I am specifying "plate" iron or steel diaphragm" as "elastic inductive plate or armature" where F mentions a "disc or diaphragm" and by the omission of the word "core" which occurs in F.~~



1st of May (31 Sholams)

Total number of rounds — 1116

Total number of rounds correct — 569

Percentage of Defects — 49

$$38 / 1057(28) \\ \underline{76} \\ 397 \\ \underline{304}$$

10th of June

Total number of rounds 1116

Total number of rounds correct ~~780~~

~~Total number of rounds~~ ~~780~~

Percentage of Defects.

All Improvement

Total Number of rounds gained

All Percentage of gain

28%

$$\begin{array}{r} 36 \\ 38 \\ \hline 74 \\ 288 \\ 108 \\ \hline 1368 \\ 311 \\ \hline 1057 \end{array} \quad 4 \quad \begin{array}{r} 246 \\ 65 \\ \hline 311 \\ 2736 \\ \hline 3740 \end{array} \quad \begin{array}{r} 569 \\ 31 \\ \hline 259 \\ 248 \\ \hline 1100 \\ 870 \\ 62 \\ \hline 250 \\ 248 \\ \hline 20 \end{array} \quad (18\%) \quad (22\%) \quad (28\%)$$

~~for a vibration of shock be imparted to the air~~
~~a dist.~~ When we clearly perceive that sound results from a ~~peculiar~~ kind movement of the air, we shall realize that the means by which that motion ^{itself} is produced, in the air is immaterial to the product of the sound.

For instance it is as feasible to produce spoken words, by the mere movement of a piece of wood or iron as to produce them by the vocal organs, ~~feel that~~ It is only necessary to move the wood or iron in the same way that the air is moved by the voice & the same results follow.

Part of sound itself —

Means by which sound can be produced.

Receiving end (receiver)

Current (resistors)

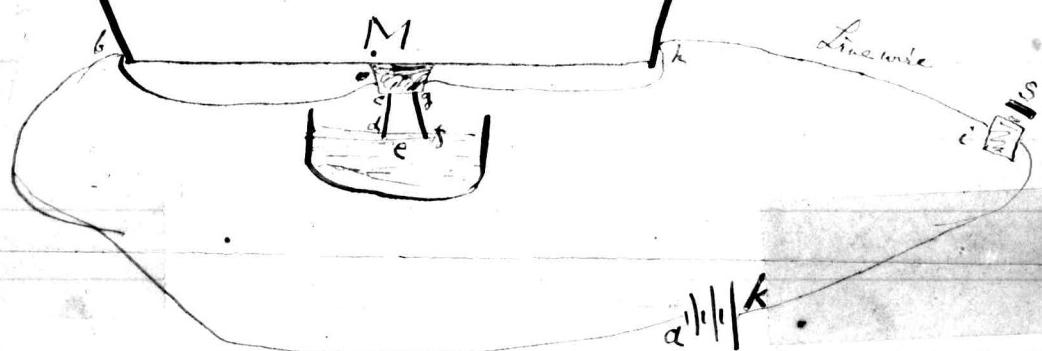
Transmitting end (resistors)

Forms of apparatus

Theoretical investigation of the effects produced ~~upon~~^{by} the voltage current by the vibration of the conducting wire in a liquid included in the circuit.

- Plan of the investigation.
1. Consider the general effects of the vibrations.
 2. Consider the effect of varying each element in the resistance.
 3. Consider the best means of increasing the amplitude of the electric undulations.

(Come to converge sound vibrations.)



1. When a sound is made in the neighbourhood of the membrane M, the ~~resistance~~^{aerial} ~~undulations~~^{of air} acting upon the membrane throw it into vibration. The wires cd, gf, are caused to dip more or less deeply into the water ~~at~~ ^{at} e accordingly as the membrane M, is depressed or elevated. The more deeply the wires cd, gf, are immersed the less resistance does the liquid, e, offer to the passage of the current. Hence the vibrations of M occasion variations in the resistance of the circuit abcdefghik; and thus affect the intensity of the current traversing it.

But the magnetization of (i) (an electro-magnet placed in the circuit) is affected dependent upon the intensity of the current traversing its coils; hence the vibration of M causes the electro-magnet (i) to attract its armature S with ~~a varying force~~^{a greater force}.

If the armature S be so arranged as to be capable of free motion then the vibration of M produces an exactly similar vibration of S - whence the sound resulting from its motion is similar to that which caused the motion of M.

2. In order to obtain the best audible effect at S - the amplitude of vibration of S should be as great as possible: ~~Hence~~ The amplitude of the electrical undulations traversing the circuit abcdefghik should be large; or, in other words the difference between the maximum and minimum of intensity in the current should be as great as possible.

Electrical Manuscripts
A. J. Bell